

Fast oscillating fundamental “constants”

Tuesday, 17 October 2023 14:00 (30 minutes)

Background ultralight scalar fields that are considered as a viable candidate for galactic dark matter may manifest themselves in apparent variation of fundamental constants, see, for example, [1,2].

In this talk, we will discuss some of the recent work of our group and collaborators, for example [3- 6], where we search for oscillating dark matter with Compton frequencies from near DC up to 100 MHz.

References

- [1] A Arvanitaki, J Huang, and K Van Tilburg, “Searching for dilaton dark matter with atomic clocks,”*Phys. Rev. D* 91, 015015, 2015
- [2] D Antypas, D Budker, VV Flambaum, MG Kozlov, G Perez, and J Ye, “Fast apparent oscillations of fundamental constants,”*ANNALEN DER PHYSIK* 2020, 1900566; arXiv:1912.01335
- [3] A Banerjee, D Budker, M Filzinger, N Huntemann, G Paz, G Perez, S Porsev, and M Safronova, “Oscillating nuclear charge radii as sensors for ultralight dark matter,” arXiv:2301.10784 (2023)
- [4] I.M. Bloch, D. Budker, V.V. Flambaum, I.B. Samsonov, A.O. Sushkov, and O. Tretiak, “Scalar dark matter induced oscillation of permanent-magnet field,”*Phys. Rev. D* 107, 075033 (2023), arXiv:2301.08514
- [5] X Zhang, A Banerjee, M Leyser, G Perez, S Schiller, D Budker, and D Antypas, “Search for ultralight dark matter with spectroscopy of radio-frequency atomic transitions,” arXiv:2212.04413 (2022)
- [6] O Tretiak, X Zhang, NL Figueroa, D Antypas, A Brogna, A Banerjee, G Perez, and D Budker, “Improved bounds on ultralight scalar dark matter in the radio-frequency range,”*Phys. Rev. Lett.* 129, 031301 (2022); arXiv:2201.02042

Primary author: BUDKER, DMITRY (Helmholtz Institute Mainz and UC Berkeley)

Presenter: BUDKER, DMITRY (Helmholtz Institute Mainz and UC Berkeley)

Session Classification: Precision Measurements and Fundamental Physics II

Track Classification: Precision Tests on Fundamental Physics